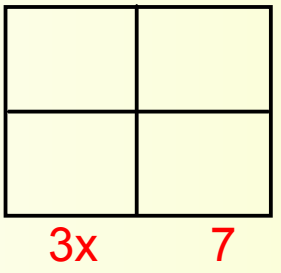
Alg. 2 Warm Up #10-5

Use an area model (generic rectangle) to rewrite the expression.

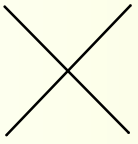
1. Rewrite the area as a sum:

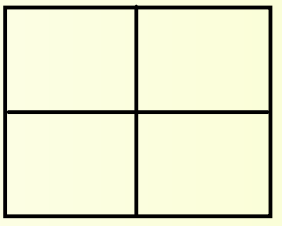
$(3x + 7)(6x - 9)$



2. Rewrite the area as a product:

$10x^2 + x - 21$





HW Questions:

Review & Preview

3-5. For each of the following expressions, find at least three equivalent expressions. Which do you consider to be the simplest?

a. $(2x-3)^2+5$

b. $\left(\frac{3x^2y}{x^3}\right)^4 = \left(\frac{3y}{x}\right)^4 = \frac{81y^4}{x^4}$

$= \left(\frac{3y}{x}\right)^2\left(\frac{3y}{x}\right)^2$

3-6. Match each expression on the left with its equivalent expression on the right. Assume that all variables represent positive values. Be sure to justify how you know each pair is equivalent.

a.	$\sqrt{4x^2y^4}$	1.	$2x\sqrt{y}$
b.	$\sqrt{8x^2y}$	2.	$2y\sqrt{2x}$
c.	$\sqrt{4x^2y}$	3.	$2xy^2$
d.	$\sqrt{16xy^2}$	4.	$2x\sqrt{2y}$
e.	$\sqrt{8xy^2}$	5.	$4y\sqrt{x}$

3-7. Bonnie and Dylan were both working on simplifying the expression at right. Each of their first steps is shown below. $\left(\frac{2x^5y^4}{8xy^3}\right)^3$

Bonnie: $\frac{8x^{15}y^{12}}{512x^3y^9}$ Dylan: $\left(\frac{x^4y}{4}\right)^3$

Each of them is convinced that they have started the problem correctly. Has either of them made an error? If so, explain the error completely. If not, explain how they can both be correct and verify that they will get the same, correct solution. Which student's method do you prefer? Why?

$\left(\frac{2x^5y^4}{8xy^3}\right)^3 = \left(\frac{x^4y}{4}\right)^3 = \frac{x^{12}y^3}{64}$

$\frac{8x^{15}y^{12}}{512x^3y^9}$

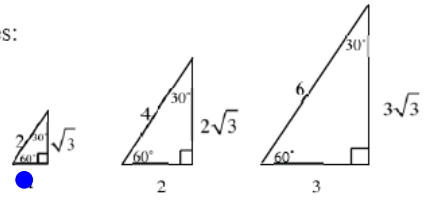
3-8. Describe the graphs of the equations given in parts (a) and (b) below. What are their domains and ranges?

a. $y = 3$ b. $x = -2$ c. Where do the two graphs cross?

3-9. Solve this system for m and b: $342 = 23m + b$
$147 = 10m + b$

3-10. Tanika made this sequence of triangles:

a. If the pattern continues, what do you think the next two triangles in the sequence would be?



b. Write a sentence to explain how to find the long leg and hypotenuse if you know the short leg (i.e., if the base is n units long).

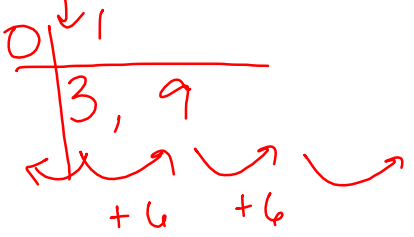
long leg = short leg times $\sqrt{3}$.
hypotenuse = short leg times 2.

3-11. Consider the sequence 3, 9, …

a. Assuming that the sequence is arithmetic with $t(1)$ as the first term, find the next four terms of the sequence and then write an equation for $t(n)$.

b. Assuming that the sequence is geometric with $t(1)$ as the first term, find the next four terms of the sequence and then write an equation for $t(n)$.

c. Create a sequence that begins with 3 that is neither arithmetic nor geometric. For your sequence, write the next four terms and, if you can, write an equation for $t(n)$.



3-12. Simplify each expression without using a calculator.

a. $25^{-1/2}$ b. $(\frac{1}{27})^{-1/3}$ c. $9^{3/2}$ d. $16^{-3/4}$

$\left(\frac{27}{1}\right)^{1/3}$

$\sqrt[3]{27}$

3

$\left(\frac{1}{16}\right)^{3/4}$

$\left[\left(\frac{1}{16}\right)^{1/4}\right]^3$

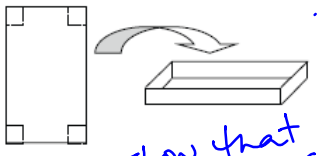
$\left(\sqrt[4]{\frac{1}{16}}\right)^3$

$\left(\frac{1}{2}\right)^3$

$\frac{1}{8}$

Yesterday's CP's:

3-2. Jill and Terrell were looking back at their work on problem 1-53 in Lesson 1.2.1. They had come up with two different expressions for the volume of a paper box made from cutting out squares of dimensions x centimeters by x centimeters. Jill's expression was $(15-2x)(20-2x)x$, and Terrell's expression was $4x^3-70x^2+300x$.



Must show that the expressions are the same

a. Are Jill's and Terrell's expressions equivalent? Justify your answer.

b. If you have not done so already, find an algebraic method to determine whether their expressions are equivalent. Be ready to share your strategy.

c. Gary joined in on their conversation. He had another expression: $(15-2x)(10-x)2x$. Use a strategy from part (b) to decide whether his expression for the volume is equivalent to Jill's or Terrell's. Be prepared to share your ideas with the class.

$(15-2x)(20-2x)x \stackrel{?}{=} 4x^3-70x^2+300x$

( )x

3-3. For each of the following expressions, find at least three equivalent expressions. Be sure to justify how you know they are equivalent.

a. $(x+3)^2-4$ b. $(2a^2b^3)^3$ c. $m^2n^5 \cdot mn^4$ d. $\frac{(x+1)(2x-1)}{x+2}$

① $(2a^2b^3)(2a^2b^3)(2a^2b^3)$

② $2^3a^6b^9$

③ $8a^6b^9$

CP's: 3- #13 ---> 21 (Pink WS)

3.1.2 How can I rewrite it?

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Rewriting Expressions and Determining Equivalence

In this lesson, you will continue to think about equivalent expressions. You will use an area model to demonstrate that two expressions are equivalent and to find new ways to write expressions. As you work with your team, use the following questions to help focus your discussion:

How can we be sure they are equivalent? → Must match exactly.

How would this look in a diagram?

Why is this representation convincing?

3-13. Jonah and Graham are working together. Jonah claims that $(x+y)^2 = x^2 + y^2$. Graham is sure Jonah is wrong, but he cannot figure out how to show it.

a. Help Graham find as many ways as possible to convince Jonah that he is incorrect. How can he rewrite $(x+y)^2$ correctly?

b. Are there any values for x and y for which $(x+y)^2 = x^2 + y^2$? In other words, is $(x+y)^2 = x^2 + y^2$ sometimes true? Justify your answer.

If $x = ?$
or $y = ?$

3-14. Do you think that an area model can help rewrite expressions that involve multiplication?

a. The area model at right relates the expressions $(2x-3)(3x+1)$ and $6x^2 - 7x - 3$. With your team, discuss how it can be used to show that these expressions are equivalent. Be prepared to explain your ideas.

	$2x$	-3
$+1$		
$3x$	$6x^2$	$-9x$

$2x \quad -3$

b. Use an area model to write an expression equivalent to $(5k-3)(2k-1)$.

c. Use an area model to write a product that is equivalent to $x^2 - 3x - 4$.

3-15. Rewrite each of the following products as a sum and each sum as a product, drawing an area model when appropriate.

a. $2x^2 + 5x + 2$

b. $(3x - 1)(x + 2y - 4)$

c. $(x - 3)(x + 3)$

d. $4x^2 - 49$

e. $(p^2 + 3p + 9)(2p - 1)$

f. $(4 - x)(x^2 + 1) + (3x - 5)$

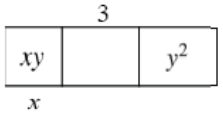
3-16. With your team, decide whether the following expressions can be represented with a model and rewrite each expression. Be prepared to share your strategies with the class.

a. $p(p + 3)(2p - 1)$

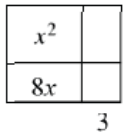
b. $x(x + 1) + (3x - 5)$

3-17. Copy each area model below and fill in the missing parts. Then write the two equivalent expressions represented by each model. Be prepared to share your reasoning with the class.

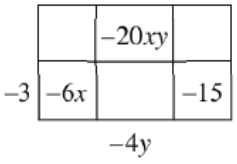
a.



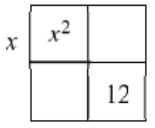
b.



c.



d.



3-18. Shinna noticed a similarity in parts (c) and (d) of problem 3-17.

a. Look back at those two problems and their rewritten form. What might Shinna have noticed? Discuss this with your team and be prepared to share your ideas with the class.

b. Shinna thinks she has found a shortcut that will allow her to rewrite expressions such as those written below without drawing a diagram. What do you think she has figured out? Try your ideas on the expressions shown below.

i. $w^2 - 81$ *ii.* $4m^2 - 1$ *iii.* $x^2 - 16y^2$

HW: Finish pink CP's and do:

3- # 23 - 25, 27,

29, 32, 35